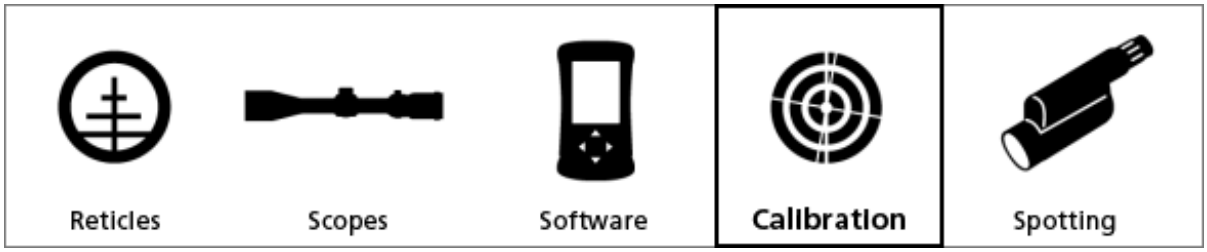

CATS™

Calibration and Training System

Targeting Validation System for the 21st Century Long-Range Specialist

User's Manual

HORUS™

By Dennis Sammut. November 18, 2010. © Horus Vision, LLC. All rights reserved.

MISSION STATEMENT

HORUS VISION IS DEDICATED TO PROVIDING THE RIFLEMAN THE TOOLS TO YIELD THE HIGHEST PROBABILITY OF A FIRST ROUND HIT AT EXTENDED RANGES.

1st Edition
January 24, 2008

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Patent Pending

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1) 30 day money back guarantee if product is returned un-used.

2) Once targets are used, they cannot be returned.

FOR INFORMATION OR SALES

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Disclaimer

Please be careful when using firearms. A mistake in judgment, a lapse of attention, a malfunction of any kind can result in serious injury or death. Bad things sometimes happen to good people. Please observe the following firearm safety rules at all times:

1. Treat every gun as if it were always loaded, even if you have verified that it is not.
2. Never allow the muzzle of a firearm to point at anything that you are not willing to destroy.
3. Keep your finger off the trigger until you are ready to shoot.
4. Be sure of your target and what is beyond. Once the bullet leaves the barrel there is no calling it back!

The information in this manual, while believed to be reasonably accurate as of the date of publication, is not warranted nor represented to be accurate, correct, or useful for any particular purpose. Use the information in this manual with caution and common sense and verify the information with respect to your own firearms before use.

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We are also not responsible for tornadoes, earthquakes, firecrackers that go off in your hand, mad cow diseases, floods, failed crops, or El Nino. So be careful and remember the four rules stated above!

Foreword

Yearly, a virtual mountain of written information is spewed forth from the word processor of gun writers. These topics cover a broad spectrum of topics such as tuning up your rifle for more accuracy, hand loading tips, evaluating new products, which cartridge is best, ad infinitum.

When the subject is "riflescopes", the writer's primary focus is on external looks, dimensions, weight, reticle, image resolution, power range and similar physical characteristics. It is impossible to find an article that evaluates a particular riflescope or runs a test on a group of a riflescope's ability to accurately respond to elevation and windage knob adjustments.

Since long range shooting requires elevation and windage adjustments to accurately engage distant targets. It is apparent that a riflescope's elevation and windage adjustment knobs have to yield precise and accurate adjustments. When a rifleman engages distant targets and misses, he usually blames the ammo, the rifle and finally himself. The riflescope is almost never looked at as contributing to errors.

The rifleman has spent a lot of money on his riflescope. He falsely assumes it is a perfectly calibrated optical instrument for shooting. It is noteworthy to mention that many police departments and military units have never calibrated their tactical riflescope.

Since no low tech, affordable riflescope testing system existed in the public domain, Horus Vision invented the "Combination Accuracy Targeting System" 'CATS' to fill this void. "CATS" is designed specifically to be used at 100 yards/meters. You do not need a 500, 1000, or 2000 yd/meter range.

In the course of testing and development, we discovered the "CATS" targets had additional value. In addition to elevation and windage, you could identify problems with cant, run-out (the point on elevation where the scope no longer tracks perpendicular), and establish maximal elevation.

The most intriguing discovery was that one could improve one's shooting ability. The “CATS” targets can be used to train the long-range rifleman while using a 100-yd/meter range.

Rifle Preparation

Preparation for using “CATS”

1. Your Rifle

   a) Make sure your rifle is in good operating condition. If you have the slightest doubt, have a competent gunsmith check your rifle.

   b) Be sure your rifle is clean.

   c) Be sure all screws are properly tightened to the proper torque. This includes the scope base and rings. You may wish to ensure that they do not shoot loose by using blue LocTite® on them.

2. Select the ammunition that consistently shoots 1 MOA or less. (Preferably ½ MOA) at 100 yds/meters. Most important, you should use the ammunition that you will use in the field.

3. Obtain accurate muzzle velocity value for your rifle firing the ammunition you select. Muzzle velocity values are extremely important.

Range Preparation

Rifle Range Preparation
Setting up your rifle range is absolutely essential to achieving quality results in assessing your optics and/or improving the quality of your rifle skills.

Exact Distance
You must decide if you are going to shoot at 100 yards or 100 meters. Unfortunately, there is no single common denominator. Most civilian and many police ranges are set up for 100 yards and for shooting in English measurement increments. Military ranges, some police and many federal agencies have ranges set up for 100 meters and/or shooting in metric increments.

All "CATS" targets are individually engineered and designed to be shot at 100 yards or 100 meters. You cannot use a "CATS" target that is designed to be used at 100 yards and shoot it at 100 meters. Your results will be invalid.

Based on your selection of English or metric, the range must be precisely measured at 100 yards or 100 meters. It is strongly recommend that you measure their distance with a steel survey chain or a high quality steel tape. Do not trust any type of range finder. Do not take anyone's word that the range is exactly 100 yards/meters.

The question usually arises: Do I measure from the middle of the riflescope or from the muzzle to the target? Both are equally important as the rifle does the shooting and the scope provides calibration adjustment. To resolve this issue, establish an imaginary point located midway between the middle of the scope and the rifle muzzle. If you place your rifle at this shooting position, you have approximately +/- 10 inches to adjust your rifle to a comfortable position. Remember, there are 3600 inches in 100 yds; this 10 inch zone produces a +/- error of approximate 1/3 of 1% (= .0033). Shooting anywhere within this 10 inch rifle placement zone will have an almost insignificant effect on +/- bullet elevation at 100/yard/meters.

Note: By measuring the range yourself, you have eliminated a major source

of error.

Target Preparation

Proper Mounting of "CATS" Targets

Height of Target

The rifle and the "CATS" target should be approximately the same height off the ground. The point of measurement on the "CATS" target should be the main horizontal line on the upside down cross.

Perpendicular To Target

The rifleman should engage the "CATS" target using a firing position that places him in an exact straight line perpendicular to the center of the target. The point of measurement on the "CATS" target should be the intersection of the main vertical and horizontal line located on the upside down cross.

Note: Inexpensive laser devices are available at most hardware stores that give an accurate 90 degree angle. Also check the newspapers for used equipment. If all else fails, you can eyeball it quite accurately if you take great care.

Vertical Mounting Of Target

When mounting the "CATS" target on the target frame, it is absolutely essential that "CATS" targets are mounted exactly vertical. The point of measurement on the "CATS" target should be the main vertical crosshair line on the target or any secondary point. We recommend the use of a high quality 48" carpenter's level. A "plumb bob" would also yield very accurate true vertical line for vertical target positioning.

CATS TARGETS

"CATS" Combination Accuracy Targeting System

"CATS" is composed of a series of 4 different types of targets. All targets are designed to be shot at exactly 100 yards/meters. Each target in the series is designed for a specific purpose.

Series I

1) Zeroing.

Series II

1) Validate the accuracy and repeatability of numerical values and "click" adjustments of your riflescopes elevation adjustment knobs.
2) Cant Validation.

Series III

1) Validate the accuracy and repeatability of the numerical values and "click" adjustments of both the elevation and windage.
2) Cant Validation.
3) Evaluation and self-improvement in Rifle Skills.
4) Training.

Series IV

1) Self-improvement and/or testing or sighting skills.
2) Instruction and Training of Riflemen.

Series 1
CATS TARGET

GENERAL DESCRIPTION

The Series 1 is used for initial zeroing of your rifle and rechecking that zero. Look at the calibration value for Series I targets. Find one that matches the calibration value to the adjustment value imprinted on the elevation and windage knobs of the riflescope mounted on your rifle. The "CATS" Series I and the riflescope should now be in sync.

SERIES I TARGETS AVAILABLE

RIFLESCOPE ELEVATION ADJUSTMENT	RANGE DISTANCE
U.S.M.C. MILS	100 METERS
U.S.M.C. MILS	100 YARDS
TMOA (TRUE MINUTE OF ANGLE)	100 YARDS

Getting Started

See ' Range Preparation ' (Page 9)

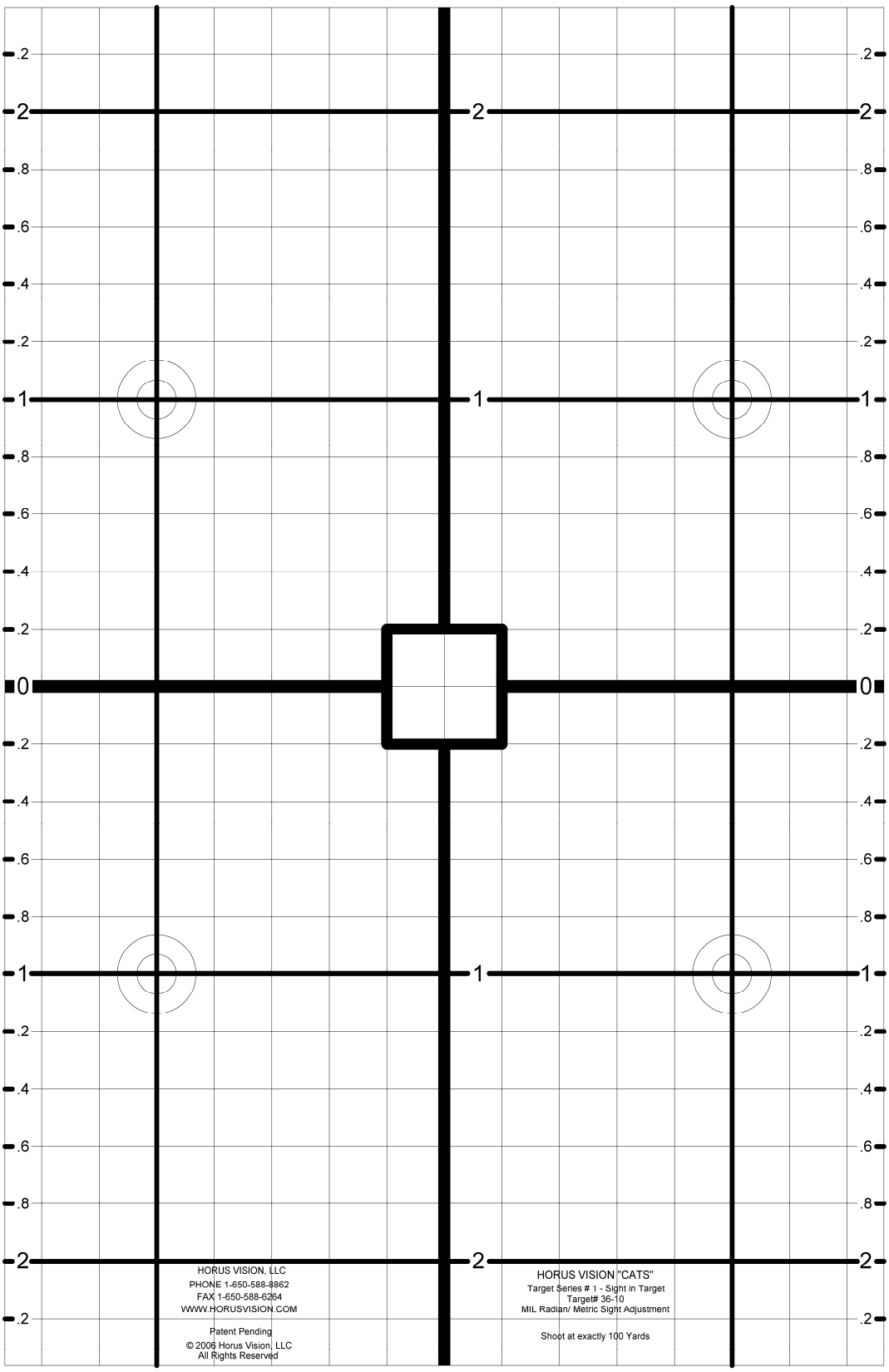
See 'Target Preparation' (Page 10)

At the range with the aid of good spotting scope, you can readily see the point of impact with the calibrated lines in the background. You can easily see how many clicks are necessary to bring your scope into adjustment period once zeroed on the target, be sure to fire at least 3 confirmed rounds.

Test & Record

Once you have obtained a "perfect zero", put up a fresh target. Shoot 3 shots to confirm that zero, remove that target and record rifle, ammunition, and scope data on the bottom of the target in the space provided.

Congratulations, you have established a base line to judge your rifle, scope and ammunition.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HORUS VISION "CATS"
Target Series # 1 - Sight in Target
Target# 36-10
MIL Radian/ Metric Sight Adjustment
Shoot at exactly 100 Yards

SERIES # 1

Note: For Police and Federal agencies, the Series I target can provide a bonafide record that each scoped tactical rifle has been zeroed. A record using Series I targets every 3 or 4 months to show you have documentation of rifle calibration verifying a perfect zero could be invaluable.

Military Long Range Snipers

Depending on your area of operation, it might be necessary to adjust your zero because of altitude and/or temperature. Readjustment is absolutely necessary if you are using a 500 or 1000 yard/meter zero. If you do not have the opportunity to correct your zero by live fire in your new operational area, the values for adjusting your elevation on your riflescope can be calculated by using Horus Vision's "ATrag™" Software. You must have confidence that your riflescope's elevation knob can make small, accurate adjustments.

The Series I target can test and verify your scope's ability to make accurate 1/10 mil corrections using the elevation knob. This verification is absolutely essential if you intend to engage targets at 800 meters and beyond.

Method

Using a new Series I Target, fire 2 shots to confirm your 100 meter zero. Move the elevation knob 1 click (1/10 mil) up and fire. Move the elevation knob 1 more click up and fire again. Continue this procedure 8 more times. Carefully examine the target, if all 10 shots are vertically aligned and spaced exactly 1 centimeter apart when measured center to center hole. After checking the target, recheck your scope's zero by giving your scope's elevation knob 10 clicks down. Fire and recheck the target. The scope should have a perfect return to zero. If the scope fails this task, I suggest the scope be returned to the unit armory or the manufacturer for repair.

SERIES II
CATS TARGET

GENERAL DESCRIPTION

Please see page 16 for a graphic illustration of the Series II "CATS" target calibrated in U.S.M.C. Mils which is designed to be shot at 100 yards. The targets listed below are very similar in appearance except they are calibrated differently to accommodate your riflescope's calibration and the rifle range you have available.

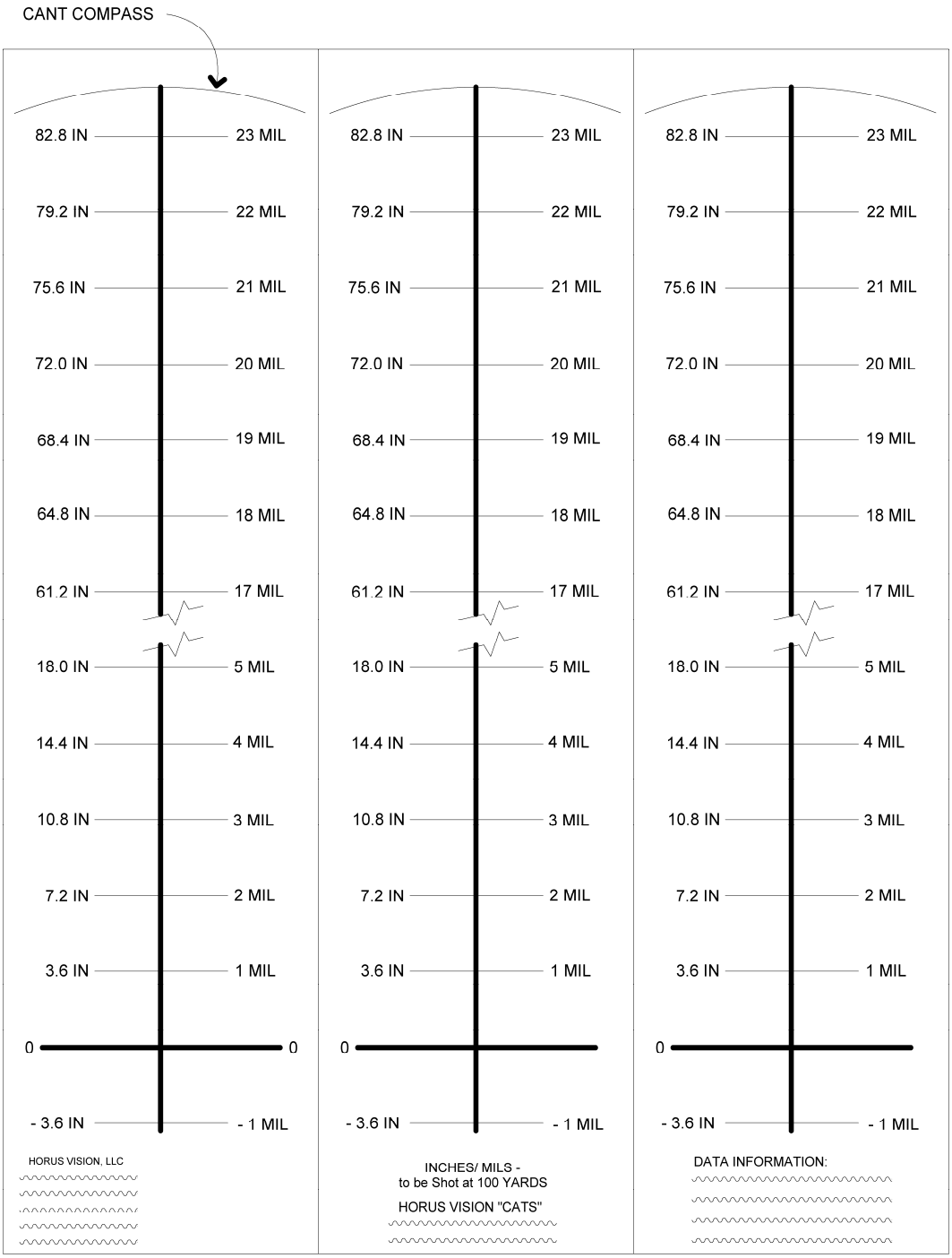
SERIES II TARGETS AVAILABLE

RIFLESCOPE ELEVATION ADJUSTMENT VALUES	RANGE DISTANCE
U.S.M.C. MILS	100 METERS
U.S.M.C. MILS	100 YARDS
TMOA (TRUE MINUTE OF ANGLE)	100 YARDS
SMOA (SHOOTERS MINUTE OF ANGLE)	100 YARDS

USES

1) You can validate the accuracy and repeatability of the numerical values and "click" adjustment on your riflescope's elevation adjustment knob.
2) Provide an extremely accurate method to check cant.
3) Can be used to zero your rifle.

The primary use of Series II target is to validate the accuracy and repeatability of your elevation adjustment knob regardless of whether your scope is in the 1st or 2nd focal plane. With the advent of PDA's (Personal Digital Assistant) that can be used in the field to calculate exact elevation holdover, your riflescope adjustments are absolutely critical to engaging targets at long-range. Poor adjustment knob accuracy and repeatability equate to missed opportunities!



1 # 2 # 3

NOT TO SCALE
GRAPHIC ILLUSTRATION

SERIES # 2

Since riflescope adjustment knobs are mechanical devices, they are subject to wear that can result in skipping, failure to move, jumping, sticking, or outright failure of the whole unit. No riflescope, regardless of cost, is immune to problems.

To insure success in the field, you should periodically use the Series II target to revalidate the accuracy of your riflescope/rifle combination. All data should be recorded on the bottom of the target. The target should be properly stored for future reference. They may be very important for checking future performance.

HOW TO USE (METHOD)

1) See Range Preparation Page 9

See Target Preparation Page 10

2) Be sure your scope/rifle combination has an absolutely perfect zero at either 100 yard/meter. A perfect zero is very important to assess the accuracy of your riflescope.

   If you are using a 2nd focal plane variable power riflescope, use the correct power setting given by the manufacturer to insure accurate elevation adjustments. If you are using a 1st focal plane variable power riflescope, you can use any power setting.

Note: If you are unsure if your riflescope is in the 1st or 2nd plane, an explanation of the differences follows.

RIFLESCOPES

"CATS" Targets will work with the 3 basic types of optical riflescopes.

1) First focal plane – variable power.

2) Second focal plane – variable power.

3) Fixed power.

Note: For those who are not sure what type of variable riflescope they have, here is a simple explanation:

If your variable power scope is in the first focal (objective) plane, all elevation and windage adjustment clicks are valid regardless of the power setting and the point of impact will not change. Most European and a few American scopes are in the first focal plane. A first plane scope can usually be identified by looking through the scope while changing the power. If the reticle changes size, the scope is in the first focal (objective) plane. If the reticle does not change size and remains a constant size, the scope is in the second (ocular) plane.

If your variable power scope is in the second (ocular) plane, the elevation and windage adjustment values are not valid for all power settings of the variable power scope. When shooting at different power settings, the point of impact will most likely change. To find the exact power setting where the calibration values of the adjustment knobs are valid and true, you must read the scope's instruction manual, call the manufacturer, check the catalog or use other means. The exact power setting is extremely important and must be determined.

If your scope has Mil-DOTS, that exact power setting is extremely important when using Mil-DOTS to determine range. A wrong power setting will yield an incorrect answer for range.

Warning: When long range shots are to be taken after the proper number of clicks have been dialed in for elevation and windage, you must be sure that the power adjustment is set to the correct power. Failure to use the correct power means your bullet could miss the target.

Fixed Power Scopes have only one power and thus all elevation and windage values are valid.

3) You should select a shooting position that gives your rifle a solid, repeatable position. The rifleman should be personally comfortable with the position. Look through your riflescope at the Series II target. Be sure the parallax is properly adjusted so the target is sharp and clear.
For a perfect zero on the target, simply overlay the vertical and horizontal crosshair in the riflescope with the heavy horizontal and vertical target lines. When both the vertical and horizontal crosshairs in your riflescope are perfectly aligned with the Series II Target lines, you will have a perfect dead center shot. Fire 2 shots to confirm your zero. For each subsequent shot, use the same method of overlaying the vertical and horizontal crosshair. All adjustments to test values are made using the elevation adjustment knob on the riflescope.
If using a Series II target calibrated in true minute of angle (TMOA), simply move the elevation knob 5 MOA for each subsequent shot. If using a Series II target calibrated in U.S.M.C. Mils, simply move the elevation knob one U.S.M.C. Mil for each subsequent shot.

4) For an illustrative example, we will use a scope calibrated in Mils. To compliment the scope, we selected a Series II target calibrated in Mils. After firing your 2 shots to confirm your target zero point, you turn your elevation knob to the 1 Mil position and fire 1 shot. Turn the elevation knob to the 2 Mil position and fire. Repeat the procedure until your scope runs out of adjustment or until you run out of target.

5) Switch now to Target # 2 (Center). Using the maximum elevation setting reached on Target # 1. Find that position on Target # 2. For all shots, you must use the same method of overlaying the vertical and horizontal crosshair to insure repeatability. Fire 2 shots to confirm that the maximum elevation position is on Target # 2.

   Turn the elevation knob down 1 Mil and fire. Repeat this procedure until you reach the zero point on the target horizontal line.

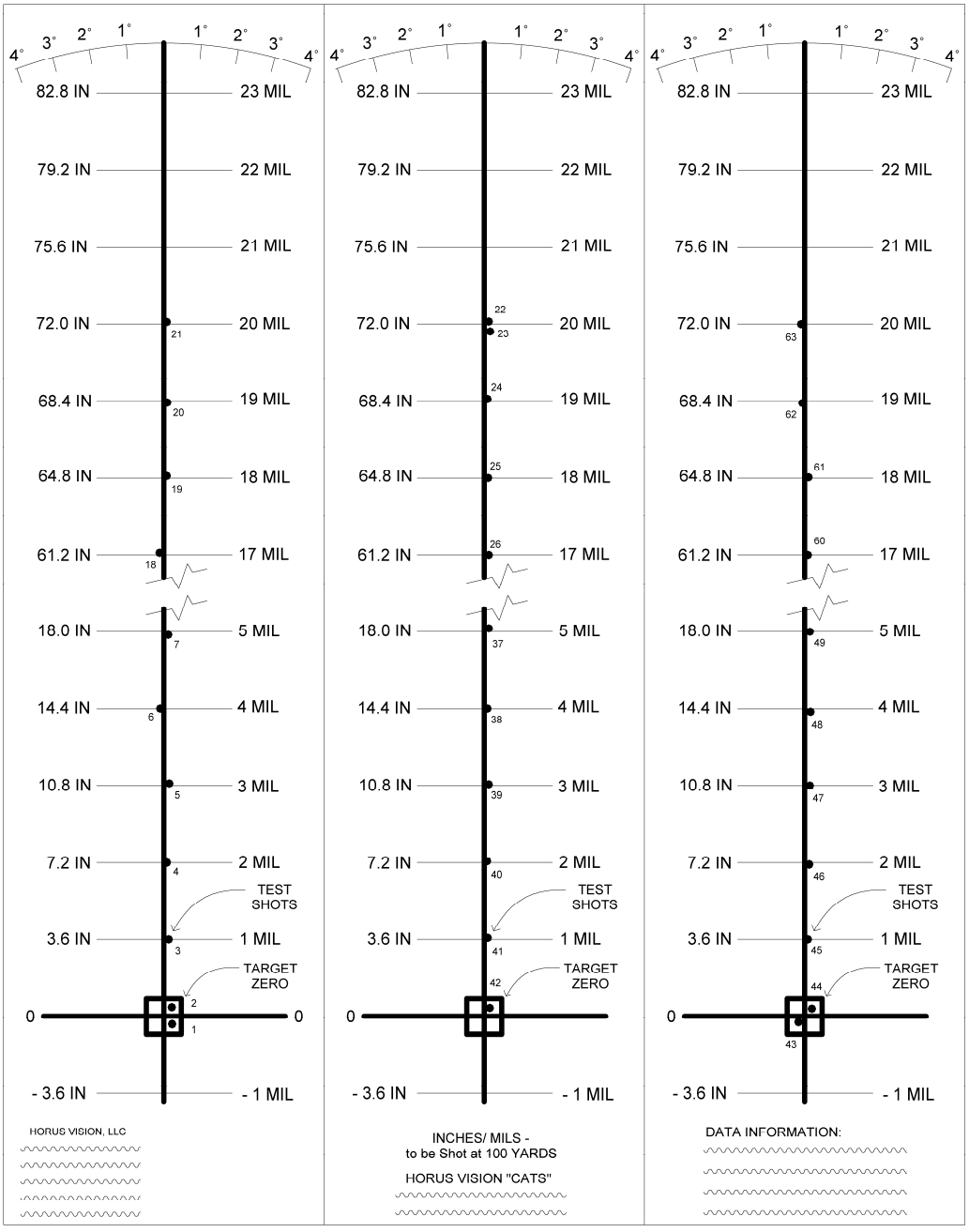
6) Switch now to target # 3 (right side). Using the same procedure used on target # 1.

7) Now check your target.
   (See Examples of various types of results)

If a problem is indicated, your riflescope should be returned to the manufacturer for repair. When the rifle scope is returned after repair, you must retest the unit to insure the problem has been corrected.

Record Data and preserve your target. To ensure this target is a valuable future reference, you should complete the data portion located on the bottom of the target.

A SERIES 2 TARGET SHOWING RIFLESCOPE AND RIFLE IN PERFECT CALIBRATION. ELEVATION VALUES ON SCOPE ARE VALIDATED.



1 # 2 # 3

NOT TO SCALE
GRAPHIC ILLUSTRATION

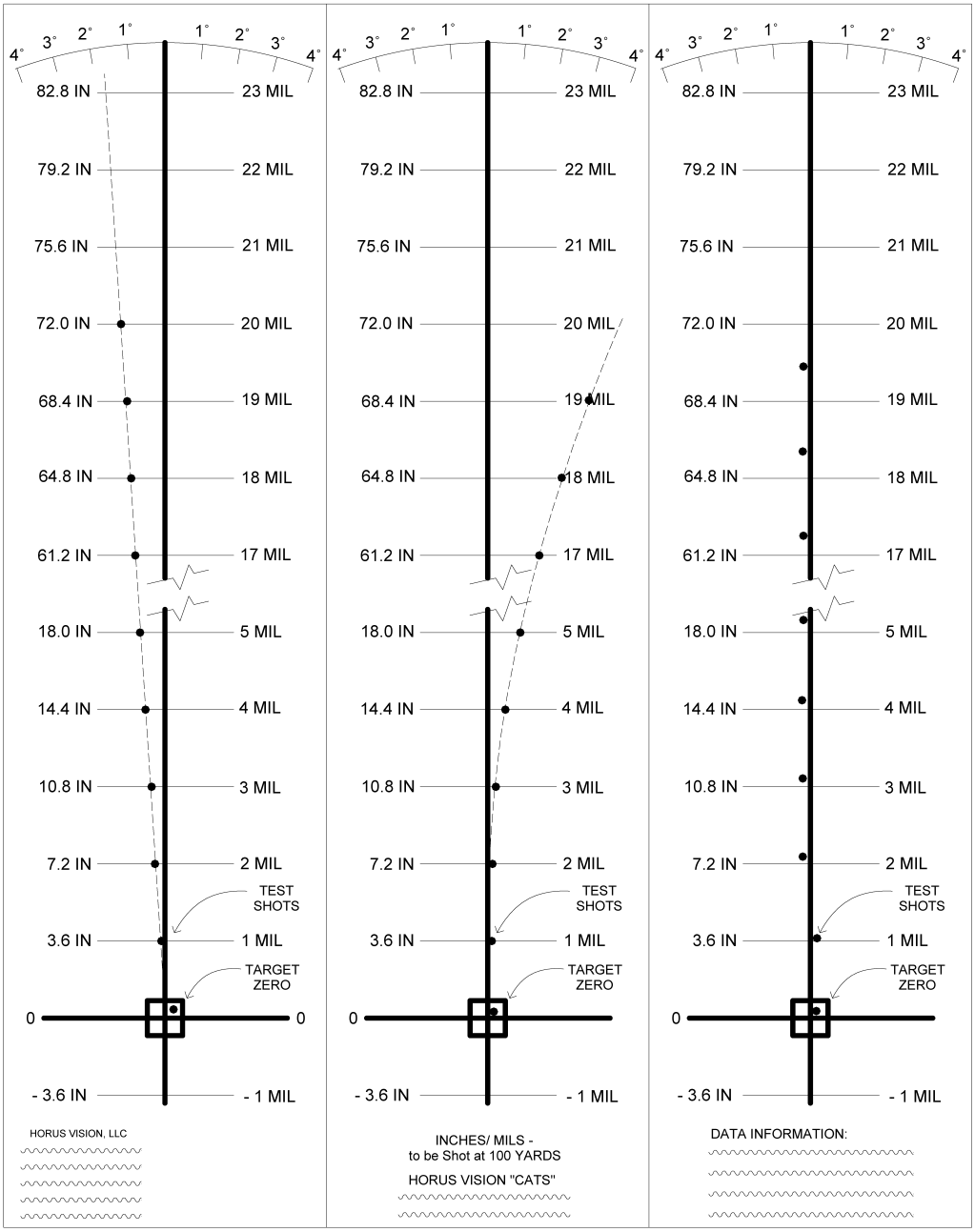
SERIES # 2

SERIES 2 TARGETS - ANALYSIS OF PROBLEMS

THIS TARGET SHOWS A SERIOUS CANT PROBLEM TO THE LEFT

TARGET INDICATES A POSSIBLE SCOPE PROBLEM RESULTING IN A SPRING TENSION PROBLEM BETWEEN ELEVATION & WINDAGE ERECTOR MECHANISM

TARGET SHOWS SCOPE HAS A PROBLEM ADJUSTING FOR CORRECT ELEVATION


4° 3° 2° 1° 1° 2° 3° 4°
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79.2 IN 22 MIL
75.6 IN 21 MIL
72.0 IN 20 MIL
68.4 IN 19 MIL
64.8 IN 18 MIL
61.2 IN 17 MIL
18.0 IN 5 MIL
14.4 IN 4 MIL
10.8 IN 3 MIL
7.2 IN 2 MIL
TEST SHOTS
3.6 IN 1 MIL
TARGET ZERO
0 0
- 3.6 IN - 1 MIL
HORUS VISION, LLC
INCHES/ MILS - to be Shot at 100 YARDS
HORUS VISION "CATS"
DATA INFORMATION:

1 # 2 # 3

NOT TO SCALE
GRAPHIC ILLUSTRATION

SERIES # 2

CANT

The Long-range rifleman must eliminate cant in order to increase his percentage of 1st Round Hits. The greater the cant, the greater the probability you will miss the target especially as the range increases.

Cant occurs when the rifle is not held vertically. On scoped long-range rifles, the problem is exacerbated. The real culprit is not knowing that your sighting system is perpendicular to the center of the rifle bore. Being perpendicular to the ground is only the beginning of the issue. To start, the center of the scope has to be perpendicular to the bore of the rifle. To further complicate matters, many scope bases and rings may be slightly off center. The bore of the barrel and the action could also be minimally off center. Finally the vertical crosshair is almost never exactly perpendicular to the rifle bore.

Horus Series II "CATS" targets are designed to show the maximal lateral displacement based on the elevation selection you are shooting. The lateral distance shown on the target gives you feed-back information to correct the cant. By correcting cant, you are eliminating the lateral movement displacement and also a slight vertical displacement.

DOES MY RIFLE HAVE A CANT PROBLEM?

1) Examine the Series II CATS Target.

2) Draw a line starting at the dead center of the interaction of the vertical and horizontal crosshair that connects all the bullet impact points.

3) If all impact points are located on the heavy black vertical crosshair, you do not have a cant problem.

4) If all impact points form a straight line to either the right or the left of the main vertical target line, you have a cant error. If you extend that line to the top of the target, you can easily read the number of degrees in your cant error.

CORRECTION OF CANT ERROR

1) Loosen the scope rings. Rotate the scope in the opposite direction of the cant shown on the target. Sometimes only a very small amount of rotation is necessary. Tighten the scope rings.

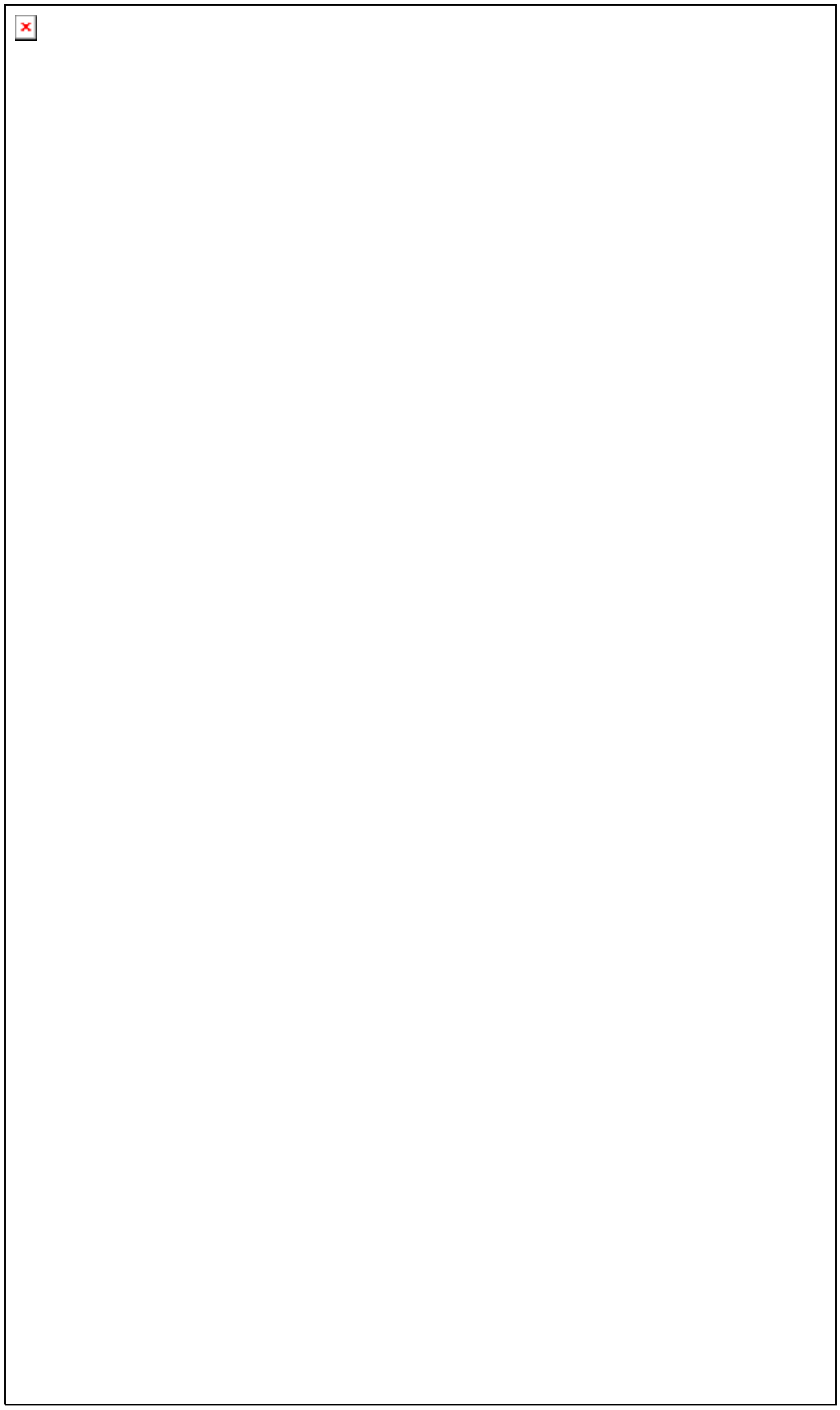
2) Re-zero your rifle using a Series I CATS Target. Be sure to check that you have a repeatable zero.

3) Set-up a Series II CATS target. Use the same method outlined earlier for shooting the Series II target.

4) Examine the target upon completion of shooting. If all shots are within the dark vertical line, you have resolved the cant issue.

5) If all impact points form a straight line either to the right or left of the main vertical target line, you still have a cant error.

Start over with the procedure outlined above until the error is corrected.



SERIES III

CATS TARGET

GENERAL DESCRIPTION

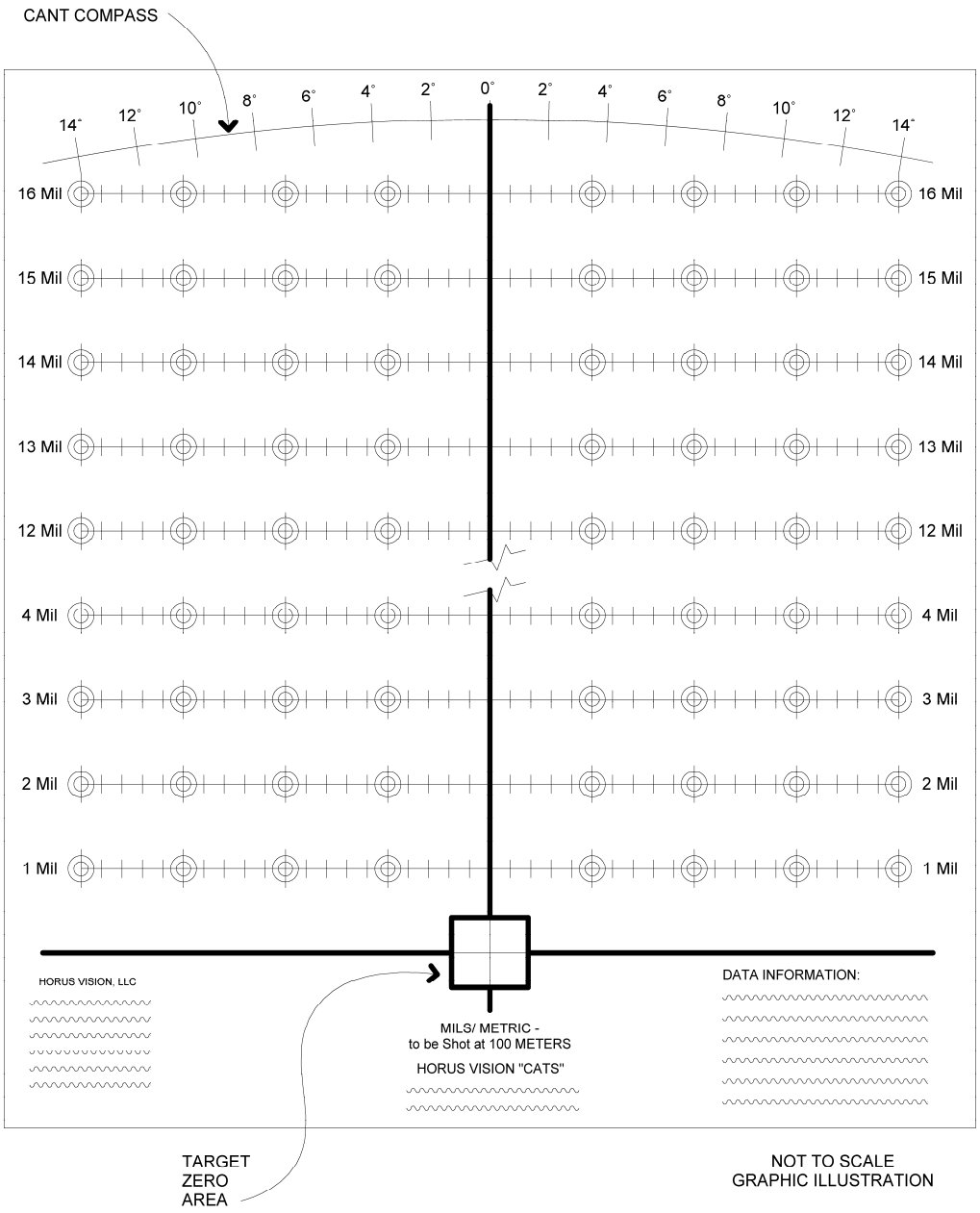
Please see page 27 for a graphic illustration of the Series III "CATS" target calibrated in U.S.M.C. Mils which is designed to be shot at 100 yards. The secondary target lines were purposely drawn very light so they can not be seen at 100 yards/meters when looking through the riflescope at high power. If you can't see these secondary target lines, you are obviously deprived of using them to hit the target at the designated point. You are only using the intersection of the main horizontal and vertical crosshair lines as your aim-point. Your bullet impact point on the target is being adjusted using the elevation and windage knobs or optically using the Horus reticle. Simply, the Series III CATS targets forces you to rely on your scope. Those light secondary lines eliminate our natural desire to consciously or unconsciously "fudge" to gain the results we desire. The targets listed below are very similar in appearance except that they are calibrated differently to accommodate your riflescope's calibration and the rifle range you have available.

SERIES III TARGETS AVAILABLE

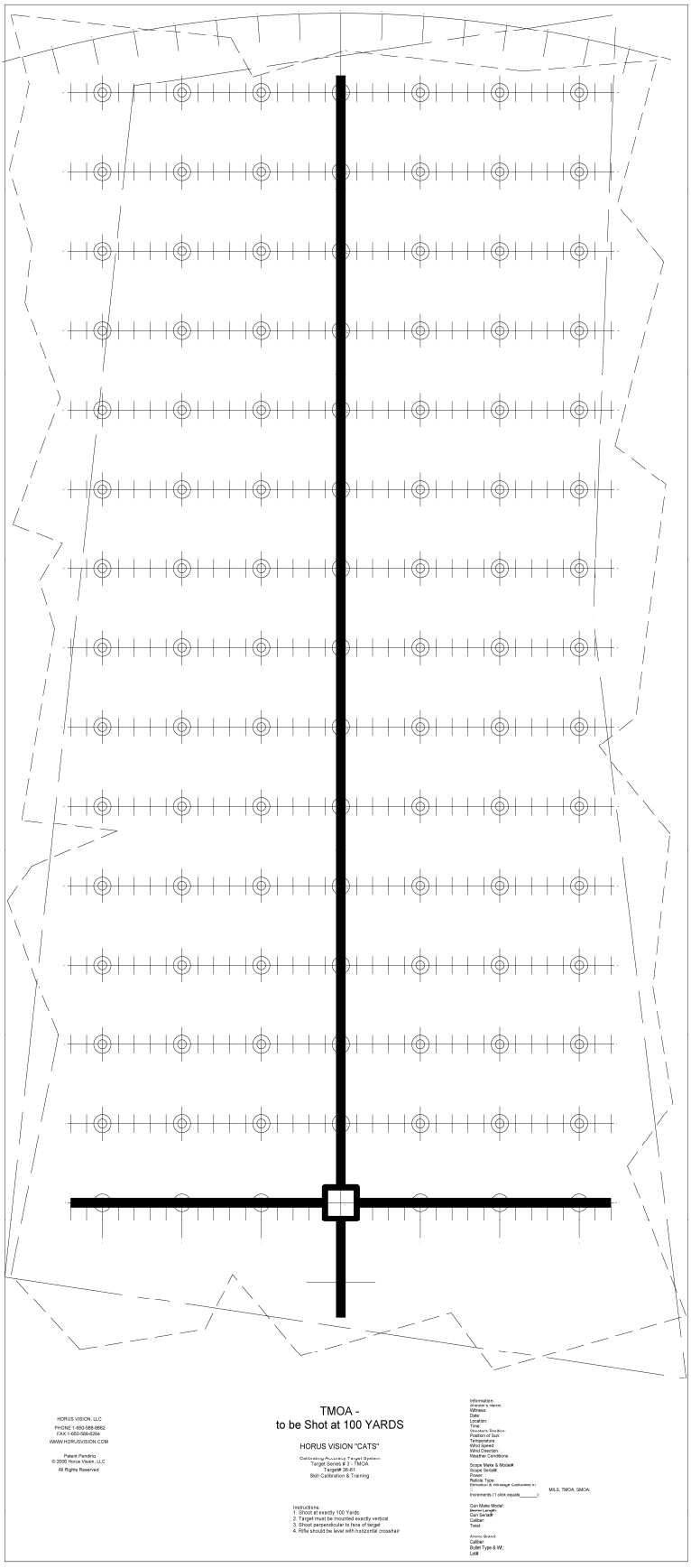
RIFLESCOPE ELEVATION ADJUSTMENT	RANGE DISTANCE
U.S.M.C. MILS	100 METERS
U.S.M.C. MILS	100 YARDS
TMOA (True Minute Of Angle)	100 YARDS

USES

1) You can validate the accuracy and repeatability of the numerical values and "click" adjustment of both the elevation and windage adjustment knobs in your riflescope.
2) Provide an extremely accurate method to check cant.
3) Can be used by the individual rifleman to evaluate and improve his extended range shooting skills.
4) As a powerful educational tool for instructing aspiring riflemen in the art of long-range shooting.



SERIES # 3


TMOA -
to be Shot at 100 YARDS
HORUS VISION "CATS"
Calibrating Accuracy Target System
Target Series # 3 - TMOA
Target# 36-61
Skill Calibration & Training
HORUS VISION, LLC
PHONE 1-650-568-9562
FAX 1-650-568-9264
WWW.HORUSVISION.COM
Patent Pending
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Instructions:
1. Shoot at exactly 100 Yards
2. Target must be mounted exactly vertical
3. Shoot perpendicular to face of target
4. Rifle should be level with horizontal crosshair
Information:
Shooter's Name
Witness
Date
Location
Time
Shooter's Position:
Position of Sun
Temperature
Wind Speed
Wind Direction
Weather Conditions
Scope Make & Model#
Scope Serial#
Power
Target Type
Reticule & Windage Calibrations in:
MILS, TMOA, SMOA
Increments (1 click equals_____)
Gun Make Model:
Barrel Length:
Gun Serial#
Caliber:
Twist
Ammo Brand
Caliber:
Bullet Type & Wt.:
Lot#

Note: The true value of the Series III target is that it requires only a 100 meter/yard range. The rifleman and/or instructor can easily evaluate the shooting performance. Singular or compound problems related to poor shooting techniques, improper use of the optics, cant or weapon problems can be readily identified.

Whether you have a 1st or 2nd focal plane riflescope, the Series III CATS allows the rifleman to validate the accuracy and repeatability of his riflescopes' elevation and windage knobs. With numerous riflescopes, the inability of fired shots to properly calibrate on the Series III paper targets sometimes occurs as the elevation adjustment is increased and the degree of windage adjustment is also increased or decreased. A "Point of Failure" is established when the elevation and windage adjustments pass the norms for proper calibration. Simply, you have validated your weapon's ability to properly track up to the point of failure. Beyond, the established point of failure, your ability to make accurate shots decreases.

Remember
The Rifleman's ability to engage long-range targets is determined by his scope's ability to yield accurate elevation and windage adjustment. Accurate mounting of the riflescope to eliminate cant is very important for extreme long-range shots.

HOW TO USE (METHOD)

See Range Preparation Page 9
See Target Preparation Page 10

Validation of accuracy and repeatability of the numerical and click adjustment values for windage and elevation knobs on your riflescope.

To validate the combination of windage and elevation values, we recommend following the shooting Pattern on the Series III target.

For illustrated purposes, we will use a scope that features elevation and windage adjustment values in mils. To compliment the scope, we have selected a Series III CATS Target calibrated in Mils.

1) Fire 2 shots to confirm your weapon is synchronized with the target zero point.
   ** You must have a perfect zero to continue.
   ** If you do not have a perfect zero, Stop, RE-ZERO your rifle.

2) a) Use the intersection of the Main Verticle and Main Horizontal Cross hairs as your primary targeting point. (Note: the vertical and horizontal crosshair make an upside down cross).
   b) Do not adjust your elevation knob (zero set at 100)
   c) Move windage 2 Mils to R ------→ Fire 1 Shot
   d) " " " 4 Mils to R ------→ " " "
   e) " " " 2 Mils to L ------→ " " "
   f) " " " 4 Mils to L ------→ " " "

3) a) Adjust your elevation knob 2 Mils Up. Remember all adjustments for windage and elevation are made by adjusting the scope's elevation and windage adjustment knobs.
   b) Move Windage 2 Mils to R ------→ Fire 1 Shot
   c) " " " 4 Mils to R ------→ " " "
   d) " " " 2 Mils to L ------→ " " "
   e) " " " 4 Mils to L ------→ " " "

4) a) Using only the elevation and windage knobs at each elevation of
      4 Mils
      8 Mils
      10 Mils
      12 Mils
      14 Mils
      16 Mils
   b) Fire the following Windage sequence
      2 Mils to R -----→ Fire 1 Shot
      4 Mils to R -----→ Fire 1 Shot
      2 Mils to L -----→ Fire 1 Shot
      4 Mils to R -----→ Fire 1 Shot

5) Naturally, you can make up your own firing Sequence.

SHOOTING SKILL IMPROVEMENT

The greatest benefit of "CATS" is realized with the Series III targets. The two (2) primary benefits are:

1) A method to analyze and improve your individual shooting skills.

2) An instructional aid to train a new generation of long-range riflemen.

Since all shooting is done at 100 yards/meters, you can focus on shooting technique and use of the riflescope. With a perfect zero on your gun, you have eliminated down range environmental factors which may influence bullet performance.

When the Series III target is properly mounted and placed at exactly 100 yards/meters, it represents a highly calibrated window located between the gun and the theoretical long-range target. This window allows the rifleman the opportunity to check the accuracy of his performance since we can calculate the exact point of bullet impact on the CATS III target. If the point of impact is off at 100 yards/meters then it will be off by some ever increasing linear amount as the range increases.

ILLUSTRATION

Shooting window at 100 yards. With Projected Values for 500, 1000, 1500 and 2000 yards : This table will give you a realistic idea how shooting technique, sighting skills, and cant can effect down range performance.

Actual inches off center by live fire at 100 yds.	Inches off center at 500 yds.	Inches off center at 1000 yds.	Inches off center at 1500 yds.	Inches off center at 2000 yds.
0	0	0	0	0
1.0	5.0	10.0	15.0	20.0
2.0	10.0	20.0	35.0	40.0
3.0	15.0	30.0	45.0	60.0

This chart allows the rifleman to quantify the results of his shooting performance at any number of ranges.

* For this illustration, a Series III target would be set-up at exactly 100 yards.

If you were using a Series III target calibrated in Mils and set-up at exactly 100 meters, you would be using centimeters instead of inches.
The Series III CATS target is a perfect vehicle for riflemen to analyze and improve their shooting skills

We recommend the following method: (For the illustrative example below, we are using a Series III calibrated in USMC Mils and a riflescope with elevation and windage turret knobs calibrated in Mils).

1) Set up the Series III target as recommended.

2) Use the exact shooting position that you would normally use for most long-range shots. For large caliber guns, use a standing bench-rest position because it allows the shooter to get directly behind the gun in a comfortable position. With this position, I can easily handle heavy recoil is easily handled.

3) Establish a "Data Card" with a shooting sequence, elevation, and windage values. This "Data Card" allows the rifleman to take maximal advantage of the Series III targets.

See page 34 to see a sample data card

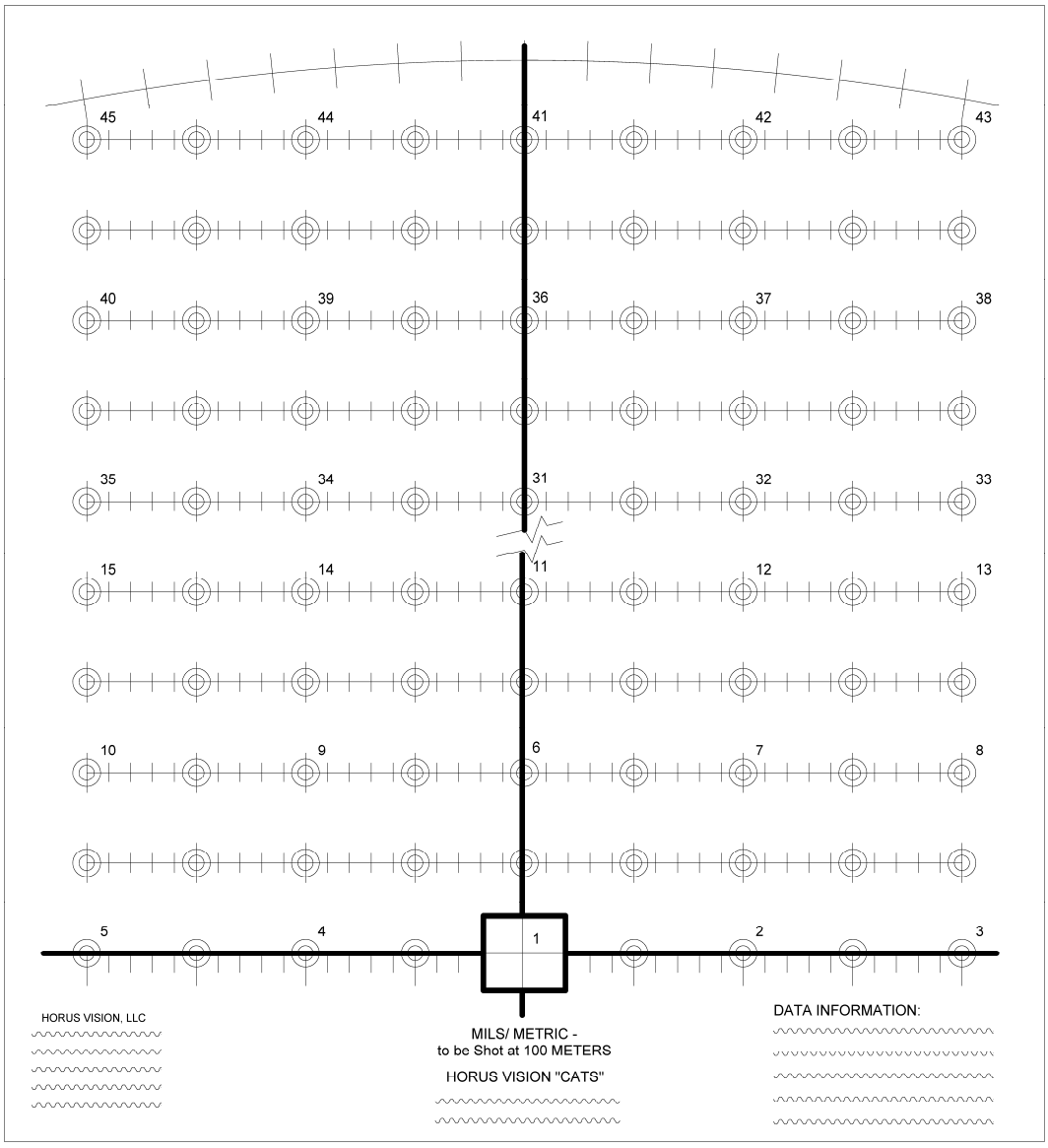
DATA CARD
FIRING SEQUENCE

SHOT SEQUENCE NUMBER	NUMBER OF SHOTS AT THAT POSITION	ELEVATION MILS TMOA	WINDAGE MIL TMOA	SCORE						
				1/2" MOA	1" MOA	1 1/2" MOA	2" MOA	2 1/2" MOA	2 1/2" + MOA	

DATA CARD
FIRING SEQUENCE

SHOT SEQUENCE NUMBER	NUMBER OF SHOTS AT THAT POSITION	ELEVATION MILS TMOA	WINDAGE MIL TMOA	SCORE					
				1/2" MOA	1" MOA	1 1/2" MOA	2" MOA	2 1/2" MOA	2 1/2" + MOA
1	2	0	0						
2	1	0	2R						
3	1	0	2L						
4	1	2	0						
5	1	2	3R						
6	1	2	3L						
7	1	5	0						
8	1	5	3R						
9	1	5	3L						
10	1	10	0						
11	1	10	3R						
12	1	10	3L						
13	1	15	0						
14	1	15	3R						
15	1	15	3L						
16	1								
17	1								
18	1								
19	1								
20	1								
21	1								
22	1								
23	1								
24	1								
25	1								
26	1								

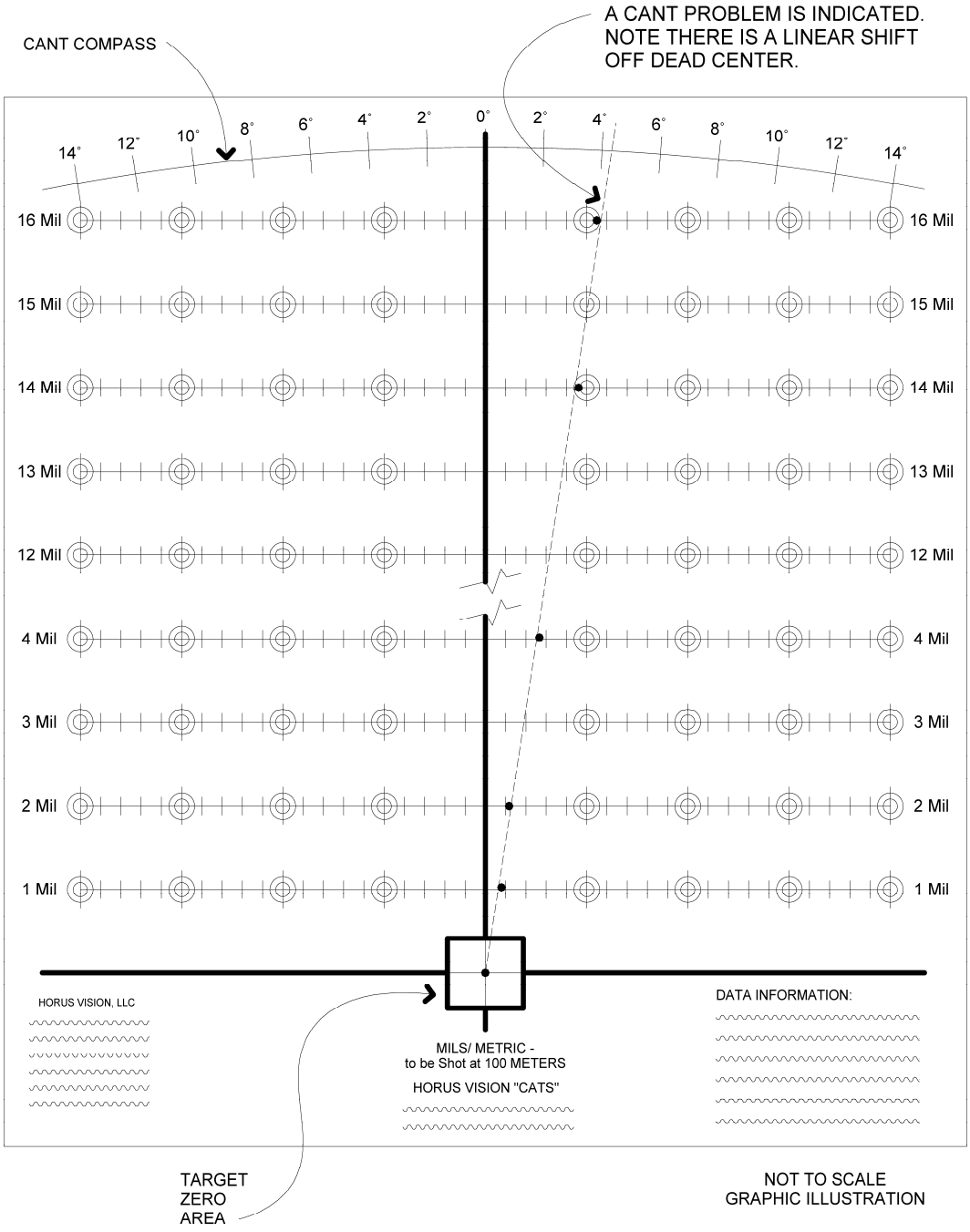
Illustrative example of a test designed by a rifleman or instructor



NOT TO SCALE
GRAPHIC ILLUSTRATION

SERIES 3
FIRING SEQUENCE

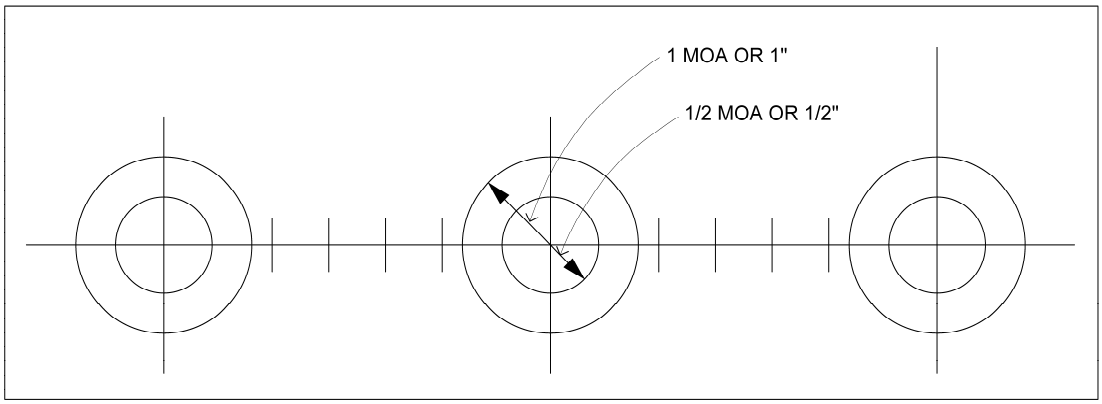
As described on page 30

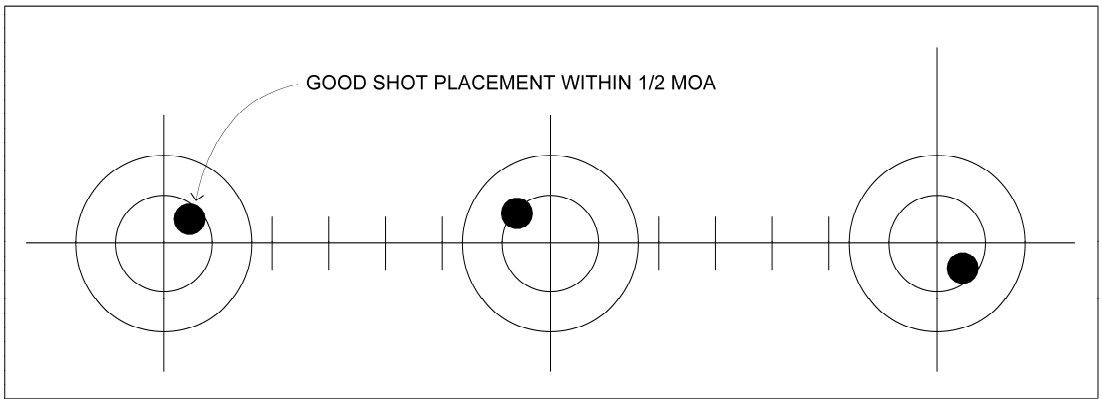

CANT COMPASS
A CANT PROBLEM IS INDICATED.
NOTE THERE IS A LINEAR SHIFT
OFF DEAD CENTER.
14˚ 12˚ 10˚ 8˚ 6˚ 4˚ 2˚ 0˚ 2˚ 4˚ 6˚ 8˚ 10˚ 12˚ 14˚
16 Mil
15 Mil
14 Mil
13 Mil
12 Mil
4 Mil
3 Mil
2 Mil
1 Mil
HORUS VISION, LLC
MILS/ METRIC -
to be Shot at 100 METERS
HORUS VISION "CATS"
DATA INFORMATION:
TARGET
ZERO
AREA
NOT TO SCALE
GRAPHIC ILLUSTRATION

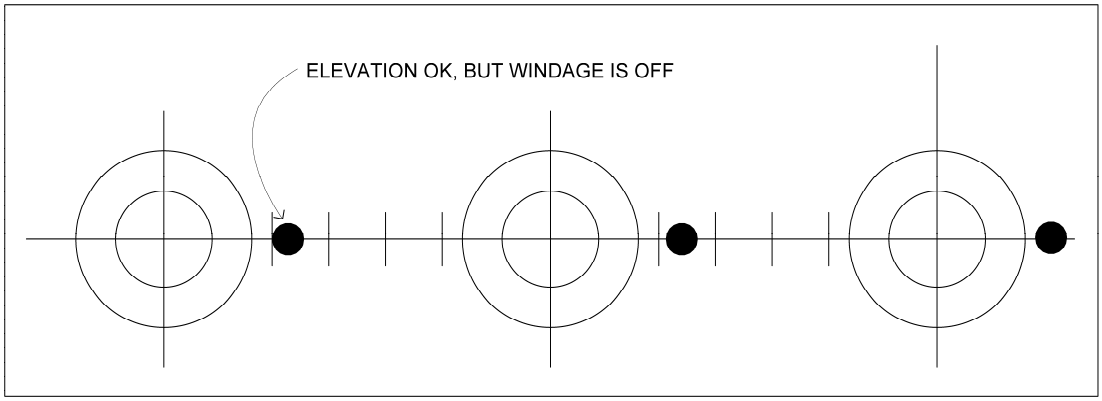
SERIES # 3

ANALYSIS OF PROBLEMS

(ENLARGEMENT - NTS)





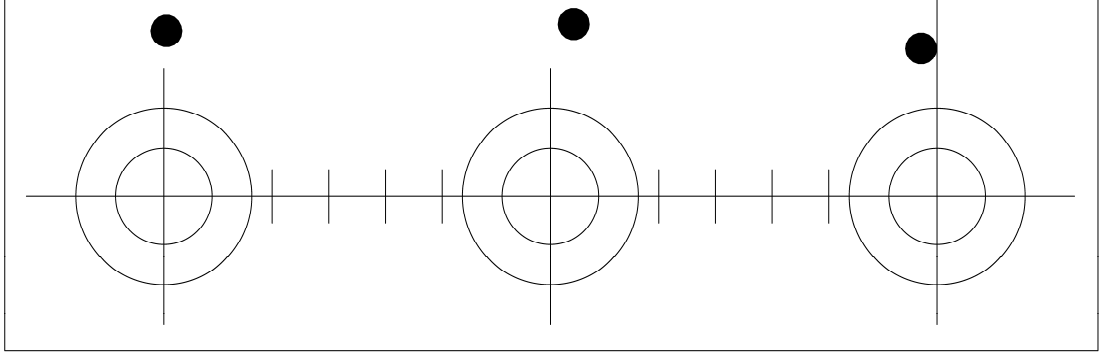


(THIS EXAMPLE SHOWS A MIL CALIBRATED TARGET)

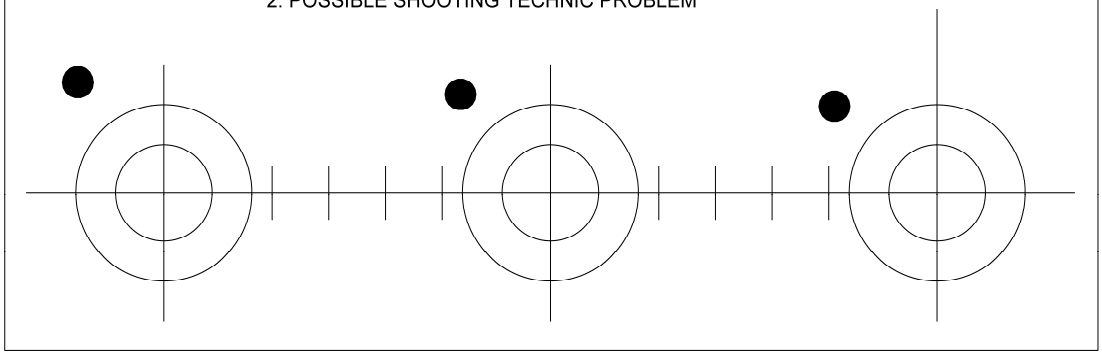
ANALYSIS OF PROBLEMS

(ENLARGEMENT - NTS)

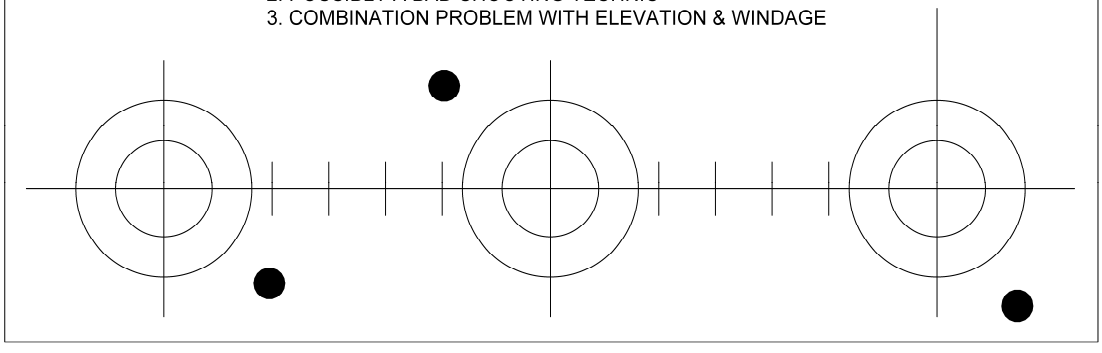
1. ELEVATION IS OFF - WINDAGE IS OK



1. BOTH WINDAGE & ELEVATION NEED CORRECTION
2. POSSIBLE SHOOTING TECHNIC PROBLEM



1. POSSIBLY A WANDERING ZERO
2. POSSIBLY A BAD SHOOTING TECHNIC
3. COMBINATION PROBLEM WITH ELEVATION & WINDAGE



4) With your best shooting technique, engage the target. Follow the shooting sequence you have outlined. At any point during the shooting sequence, you can stop and check the target and CRITIC your shooting performance.

   Note: If you see that you are unable to shoot at a consistent 1 MOA level or less, stop. Re-evaluate your shooting and/or scope technique. Make the changes which you believe will yield the desired results. Paste the holes in the target. Once again, engage the target. Start your shooting sequence outlined on your data card.

5) A perfect shooting performance requires all target points listed on your data card to show sub ½ MOA shot placement. A consistent sub ½ MOA performance is extremely difficult. Realistically, when you achieve a goal of 1 MOA or less for each of the targeting points on the Series III target, you can increase the level of difficulty. Here are some recommended methods to improve skills. Feel Free to develop your own methods.

a) Establish an elapsed time to shoot the firing sequence shown on your data card. Work against this time criteria while trying to improve your accuracy.

b) Speed drills: Set an unrealistically short time to complete the entire firing sequence on the data card. Force yourself to go for it.

c) Shoot at different times of the day. The sun will be in different positions relative to the target. Try shooting at dawn and dusk under twilight conditions. You will discover that light is a critical factor in proper shot placement.

d) Shoot at night: Try lighting the target from different positions. Place a light bulb directly in front of the target. Try placing the single light to the side (90 degrees) of the target. Try illuminating the target with a spot light placed behind you. Use night vision devices attached to your scope.

Using Series III CATS as an Instruction aid to train long-range riflemen

Accurate long-range shooting involves numerous factors including shooting technique, rifle specifics, ammunition, sighting system and environmental factors. By using CATS targets at exactly 100 yards/meters, specific factors such as rifle specifics, ammunition, environmental conditions become "constants" because of the short range. In other words, these factors will have little or no effect at 100 yards/meters once a perfect zero is established.

The Series III CATS becomes a valuable instructional tool because the shooting instruction can focus specifically on shooting technique and the sighting system.

Methods of Instruction

These are only suggestions. Instructors should develop their own curriculum.

1) To start, we suggest using the techniques outlined in the preceding section labeled "The CATS Series III." This is a perfect vehicle for riflemen to analyze and improve their shooting technique.

2) Students should be instructed in the proper use of anti-cant devices, such as:
    a) Scope Level
    b) Horus Vision's ASLI™
    c) MGW Bubble Level

    They should be encouraged to use the anti-cant device on all shots.

3) The instructor should call shot coordinates and the student should engage the Series III target ASAP.

4) Instructor can state range and let students calculate the hold and then engage the Series III target.

SERIES IV
CATS TARGET

The Series IV is the most difficult and challenging in the CATS Series of targets. This target is designed to challenge the individual rifleman's proficiency and/or to test the abilities of newly minted long-range shooters. To obtain a high number of well placed shots, the rifleman must be extremely well versed and perfect in his shooting technique, in combination with a complete mastery of his riflescope. So to further complicate and increase the level of difficulty, the rifleman must rely on his anti-cant device.

GENERAL DESCRIPTION

Please see page 42 for a graphic illustration of the Series IV CAT target calibrated in USMC Mils which is designed to be shot at 100 yards. On the Series IV, all primary and secondary target lines were purposely drawn very light so they can not be seen at 100 yards/meters when looking through the riflescope at high-power. If you can't see any lines at 100 yards/meters, the rifleman is obviously deprived of using reference lines to accurately hit the target at the designated point. The rifleman can only use the small square targeting box located on the bottom of the target.

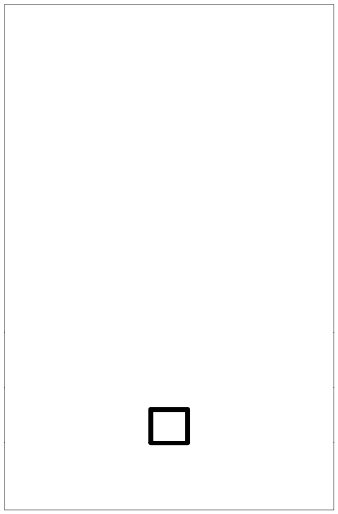
The bullet impact point on the target is being adjusted using the elevation and windage knobs or optically using the Horus reticle. In addition, the rifle must be held perpendicular to avoid "cant".

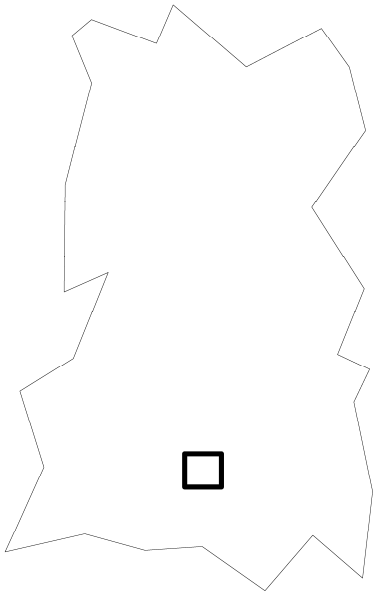
Simply, the Series IV CATS target forces you to employ a superior shooting technique and develop superior riflescope skills. Those light lines eliminate our natural desire to consciously or unconsciously "fudge" to gain the results we desire.

To increase the level of difficulty, the rifleman and/or instructor can attach the Series IV target to a large piece of cardboard. Using a pair of scissors or razor cutter, you can cut along the dotted pattern located around the edge of the target. Cutting the Series IV target in this manner removes any vertical or horizontal reference points for the rifleman to use when engaging the target. See illustration on page 42.

SERIES IV TARGETS AVAILABLE

RIFLESCOPE ELEVATION ADJUSTMENT	RANGE DISTANCE
U.S.M.C. MILS	100 METERS
U.S.M.C. MILS	100 YARDS
TMOA (True Minute Of Angle)	100 YARDS





SERIES # 4